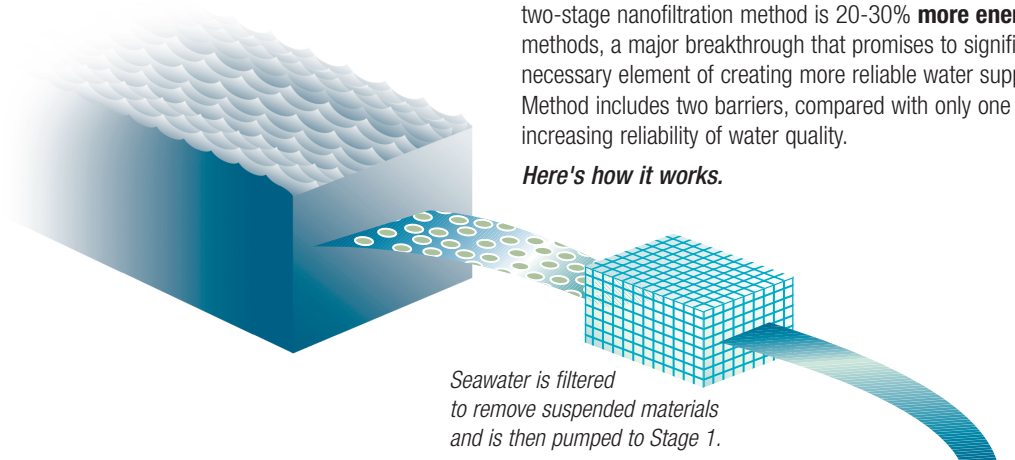
Seawater Desalination – The Long Beach Method

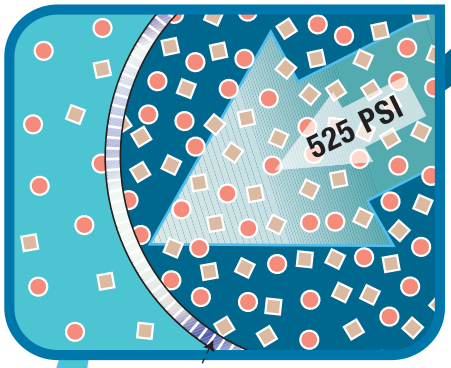
The Long Beach Water Department has developed exciting new proprietary technology to convert seawater into **high-quality drinking water** in the most-cost effective manner. The Long Beach two-stage nanofiltration method is 20-30% **more energy-efficient** than traditional desalination methods, a major breakthrough that promises to significantly cut costs and make desalination a necessary element of creating more reliable water supplies for the future. In addition, the Long Beach Method includes two barriers, compared with only one for traditional desalination processes, thereby increasing reliability of water quality.

Here's how it works.

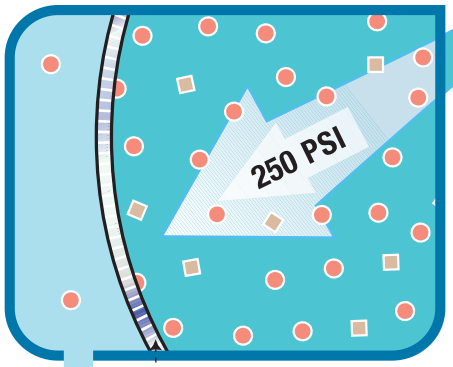


Seawater is filtered to remove suspended materials and is then pumped to Stage 1.

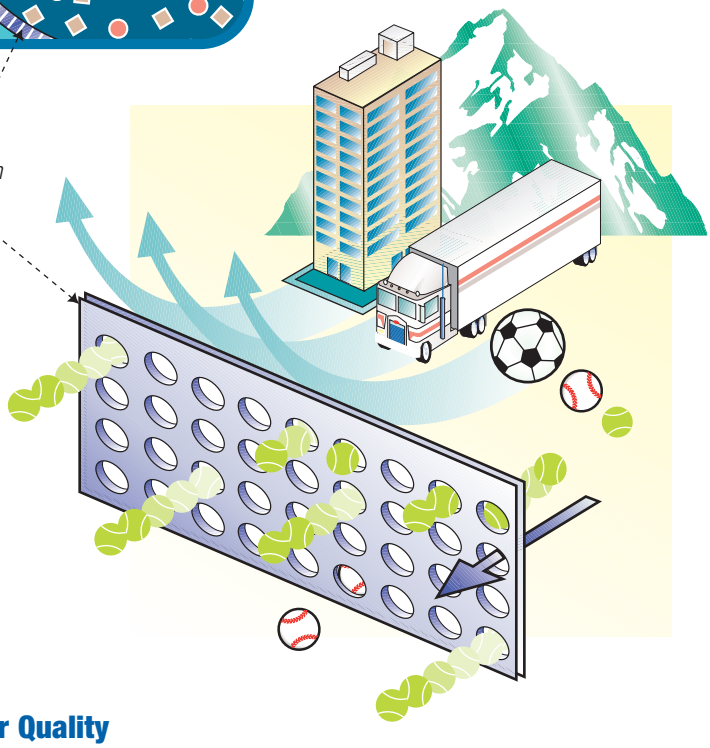
Stage 1: *Filtered seawater is pumped under high pressure through nanofiltration membrane, which allows water molecules to pass but blocks all but the smallest 12% of salt molecules.*

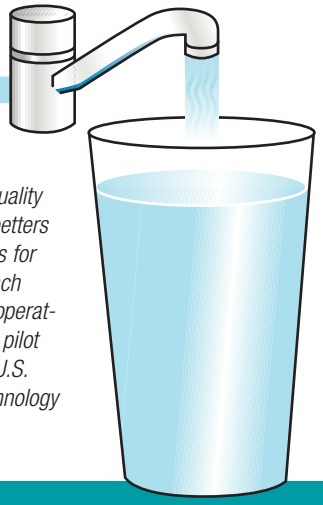


Stage 2: *Water from Stage 1 – seawater with only smallest 12% of salt molecules – is pumped under lower pressure through second nanofiltration membrane, which blocks passage of almost all remaining salts.*



Nanofiltration membranes





The process produces high-quality potable water that meets or betters all state and federal standards for safe drinking water. Long Beach Water Department has been operating a two-stage nanofiltration pilot plant since October 2001. A U.S. patent application for the technology is pending.

Energy Savings

Traditional desalination pushes seawater through a single membrane at pressures of approximately 1,000 pounds per square inch (PSI). The Long Beach Method pushes seawater through Stage 1 at far less pressure (525 PSI). The resulting water, about 40% of the original amount, is then pushed through Stage 2 at 250 PSI. The result: the Long Beach Method requires 20-30% less energy than traditional desalination. Both the Long Beach Method and traditional desalination require approximately 3 gallons of seawater to produce one gallon of potable water.

Water Quality

Nanofiltration membranes are made of semi-permeable material that allow almost nothing larger than pure water molecules to pass through. Because they are larger than water molecules, most salt molecules and other materials are left behind. In the above illustration, if water molecules are tennis balls, then salt molecules are soccer balls and softballs, viruses are trucks, bacteria are buildings and protozoa are mountains. The Long Beach Method includes two barriers, compared with only one for traditional desalination processes, thereby increasing reliability of water quality.

Long Beach Water Department working in partnership with the U.S. Bureau of Reclamation to advance desalination technology.

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